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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,187	08/02/2006	Hiroki Sato	8007-1114	6778
465 7590 10/05/2009 YOUNG & THOMPSON 209 Madison Street Suite 500 ALEXANDRIA, VA 22314			EXAMINER HAIN, TOBY	
			ART UNIT 1621	PAPER NUMBER
			MAIL DATE 10/05/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/588,187

Applicant(s)

SATO ET AL.

Examiner

TOBY D. HAIN

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 9-11 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-850)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 07/23/2008, 11/02/2006, 08/02/2006

DETAILED ACTION

Claims Status

US utility patent application 10/588,187 contains 10 pending claims. Claims 5 and 12-14 have been cancelled, and claims 1-5 and 7-11, directed to an alkoxide compound of general formula I (see claims for structure), are pending and treated in the instant first Office action on the merits.

Election/Restrictions

Applicant's election without traverse of Groups I, claims 1-5 and 7-11, in the reply filed on 15 September 2009 is acknowledged.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 23 July 2008, 2 November 2006, and 2 August 2006, are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Objections

Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 8 repeats the sole limitation in claim 4 without an additional recited limitation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Mehrotra et al., 24 J. ORGANOMET. CHEM., 611-21 (1970) (made of record in the IDS filed 2 August 2006).

Mehrotra teaches the following compounds with the corresponding melting points (p. 614, Table 1):

Product formed
B.p. (°C/mm)

$\text{Si}[\text{OCH}_2\text{CH}_2\text{N}(\text{CH}_3)_2]_4$
138–140/0.8
(89)

$\text{Si}[\text{OCH}_2\text{CH}_2\text{CH}_2\text{N}(\text{C}_2\text{H}_5)_2]_4$
195–198/1

$\begin{array}{c} \text{CH}_3 \\ | \\ \text{Si}[\text{OCH}-\text{CH}_2\text{N}(\text{CH}_3)_2]_4 \end{array}$
103–105/0.2

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim *et al.*, 10 SURF. REV. LETT., 685-89 (2003).

At p. 685 Lim teaches that:

Dimethylaminoethoxy (dmae) is a donor-functionalized alkoxy ligand, which is used as the organic components of metal-dimethylaminoethoxide metal-organic compounds. For example, zirconium tetrakis-dimethylaminoethoxide $[\text{Zr}(\text{dmae})_4]$ and hafnium tetrakis-dimethylaminoethoxide $[\text{Hf}(\text{dmae})_4]$ are used as metal-organic precursors to deposit ZrO_2 and HfO_2 thin films on Si(100), respectively, by metal-organic chemical vapor deposition (MOCVD).⁷ The metal-dmae bond is expected to easily decompose into dmae and metal chemisorbed on the surface.

The difference between Lim and the instant claimed invention is that Lim discloses compounds that include straight chain alkyl linkages between the oxygen and nitrogen atoms (in dmae) instead of a branched chain alkanediyl. However, one skilled in the art recognizes that $\text{Hf}(\text{OCH}_2\text{CH}_2\text{N}(\text{CH}_3)_2)_4$ and $\text{Hf}(\text{OCH}(\text{CH}_3)\text{CH}_2\text{N}(\text{CH}_3)_2)_4$ are homologous and expected to have the similar reactivities and physical properties. See MPEP § 2144.09. For example; the expected overlayer structures of the two hafnium compounds adsorbed onto a silicon surface will be similar; lateral interactions and surface mobility as well as phase transitions are apt to be substantially identical. When heated, the pyrolysis of the material and radical formation will also be similar.

It would have been prima facie obvious to one having ordinary skill in the art at the time the invention was made to use the teachings of Lim to arrive at the claimed compounds and materials. Lim teaches hafnium alkoxides that are used in thin film coatings. Given the physical properties of the hafnium alkoxides implicit in Lim to the application of the hafnium alkoxide to CVD processes, one skilled in the art would be motivated to use the compounds with a reasonable expectation of successfully obtaining an economically viable source of thin film precursors.

Conclusions

No claims are patentable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOBY D. HAIN whose telephone number is (571)270-1329. The examiner can normally be reached on Monday-Friday 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Sullivan can be reached on (571)272-0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TOBY D HAIN/
Examiner, Art Unit 1621

/Daniel M Sullivan/
Supervisory Patent Examiner, Art Unit 1621